

NON-PUBLIC?: N
ACCESSION #: 9004180246

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Fort Calhoun Station Unit No. 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000285

TITLE: Loss of Off-Site Power and Diesel Generator Actuation
EVENT DATE: 02/26/90 LER #: 90-006-00 REPORT DATE: 03/28/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 5 POWER LEVEL: 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Dan Rosloniec, Shift Technical TELEPHONE: (402) 533-6899
Advisor

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On February 26, 1990, Fort Calhoun Station Unit No. 1 was 9 days into a refueling outage. At 1450 hours an unplanned actuation occurred in the backup trip circuit for the 345 KV breaker 3451-5. This isolated all four 4160 busses from the 22 KV power which was supplied from the off-site 345 KV line. Diesel Generator D2 started automatically. Power from the 345 KV source was restored within 14 minutes.

The most probable cause of this event was inadvertent physical disturbance and resultant actuation of a relay in the backup trip circuitry for the 345 KV breaker. However, since there was no way to positively verify this conclusion, the root cause of this event is classified as unknown.

An evaluation will be performed to identify better ways to prevent

unplanned safety system electrical control actuations.

END OF ABSTRACT

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At Omaha Public Power District's (OPPD) Fort Calhoun Station Unit No. 1, the 22 KV plant generator output is normally stepped up to 345 KV and supplies the offsite power distribution system through two breakers. The 22 KV system may also supply power to the four 4160 volt busses from the plant or from the off-site 345 KV line when required. The 4160 volt busses 1A3 and 1A4 supply safety related components including the Low Pressure Safety Injection (LPSI) pumps. A loss of normal power to bus 1A3 or 1A4 causes an automatic start and connection of the associated diesel generator to the bus as an Engineered Safeguards feature. Backup circuitry exists in the control room to provide a means of disconnecting the 4160 volt plant busses from the 22KV power source if either 345 KV breaker fails to open when it receives a trip signal. In the breaker failure backup mode (if 345KV Breaker 5 fails to open as required), the lockout relay 86-2/BF5 is actuated by relay 86X/BF5 which is energized by relay 86-1/BF5. There are various relays associated with the switching circuitry for these power sources. Some of these relays, including the 86X/BF5, are located inside Control Room Panel AI-26A.

The power source switching circuitry also includes a LPSI pump breaker interlock. If a LPSI pump has been manually connected to a 4160V bus and normal supply power to the bus is lost, the interlock prevents both automatic opening of the LPSI pump breaker and the backup diesel power supply from energizing the bus. In this mode, the undervoltage trip circuitry of the LPSI pump is bypassed. The LPSI pump must be manually disconnected from the bus before the diesel power supply closes in. This is an original plant design feature which provides additional operational flexibility by allowing pump operation even during degraded voltage conditions.

On the afternoon of February 26, 1990, the plant had been shutdown for 9 days for a refueling outage and was in Mode 5. Prior to this time both safety related 4160 volt safety busses 1A3 and 1A4 were operable. The backup power source for bus 1A3, Emergency Diesel Generator D1, was out for maintenance. Shutdown Cooling was being maintained using the LPSI pump SI-1B powered from bus 1A4. Emergency Diesel Generator D2 was the operable back-up power source for bus 1A4. The normal 161 KV power source for the 4160 volt safety busses was inoperable and the plant was being powered from the 345 KV line through the 22 KV system. A containment purge was in progress at the time. The Personnel Air Lock (PAL) door was open, the containment equipment hatch was open, and the

outside roll-up door in adjoining Room 66 was raised. A contractor technician working on a data base update project for the OPPD Nuclear Projects Department was in the vicinity of Panel AI-26A verifying nameplate data for components on Control Room panels.

At 1450 hours an unplanned actuation occurred in the backup trip circuit for the 345 KV breaker 3451-5. Lockout Relay 86-2/BF5 tripped which opened the 4160 volt bus breakers 1A11, 1A22, 1A13, and 1A24. This isolated all four 4160 busses from off-site power. Diesel Generator D2 started automatically. The LPSI pump breaker interlock prevented the diesel from energizing the bus automatically while the breaker was closed. The LPSI pump breaker had been manually closed for shutdown cooling and it remained closed as designed when the 4160 volt bus lost power.

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The operators opened the pump breaker, the diesel automatically energized the bus, and the operators reclosed the breaker re-establishing shutdown cooling flow 44 seconds after the initial loss of power. Power from the 345 KV source was restored to the 1A3 4160V bus at approximately 1504 hours. At 1518 hours, Diesel Generator D2 was unloaded and the 1A4 4160V bus was powered from the 345 KV source.

Pursuant to 10 CFR 50.72(b)(2)(ii), a four hour report was made on February 26, 1990 at 1600 hours. Section 6.1.5 of the Fort Calhoun Station Updated Safety Analysis Report notes that unplanned starting of an Emergency Diesel Generator is considered actuation of an Engineered Safety Feature for reportability purposes.

This event had low safety significance. A recorder printout showed that the Reactor Coolant System (RCS) temperature increased no more than 2 degrees F during this event. All safety systems operated as expected, and operator response was timely and effective. Since the open containment hatches provided a potential alternate release path during the period when the purge fans lost power, a containment sample was taken after the event. Calculation of a postulated release through the containment equipment hatch showed that the limits of the existing containment release permit were not exceeded. The postulated release was based on full flow of the containment purge supply fans of 45,000 CFM. Actual air flow from the containment building was less than full flow since the fans supplying air to containment were de-energized and coasting to a stop because of the loss of power.

Possible causes of the event were investigated. During this event, none

of the other trips associated with an actuation of 86-1/BF5 occurred, so actuation of this relay was ruled out. Relay 86-2/BF5 cannot be manually tripped by a switch, and since it was successfully reset, no mechanical failure was suspected. There was no indication that the relay cover was disturbed so inadvertent actuation by physical movement was not suspected. Thus, the most probable reason for tripping of relay 86-2/BF5 was actuation by relay 86X/BF5. There are no other devices designed to be actuated by relay 86X/BF5, so it cannot be confirmed that this relay actuated during the event. However, dust on the cover for this relay had been disturbed, indicating physical contact with something. This relay is a General Electric "HGA" type which is sensitive to physical movement. This type relay has actuated in the past when the cover was removed or replaced.

After the event, the technician who was verifying nameplate data in the vicinity of relay 86X/BF5 was questioned about his activities. His task did not require any physical contact with the components being inspected. He stated that he had paperwork set on the floor near panel AI-26A but he was not verifying data on that panel at the time of the event. He had been carrying a flashlight and an inspection mirror in his rear pocket. He conceded that these objects could have inadvertently come in contact with the relay during his data verification. He had never previously performed equipment inspections in close proximity with electrical relays.

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Based on the circumstantial evidence noted previously and the known sensitivity of the type relay involved, it was concluded that the most probable cause of the event was the disturbance of relay 86X/BF5. The most probable source of the disturbance was inadvertent contact by the technician or his tools during his data verification activities. However, since there was no way to positively verify these conclusions, the root cause of this event is classified as unknown.

Several actions have been planned to help prevent recurrence:

- (1) Memoranda have been issued to appropriate plant personnel by departmental management reminding employees to use caution when working around electrical control equipment.
- (2) Plant management will evaluate present administrative guidance and controls for work which could affect electrical control equipment. The purpose of this evaluation will be to identify programmatic improvements which could prevent unplanned actuations of safety systems. This evaluation will be completed by August 1, 1990.

During evaluation of this event, some questions were raised by NRC personnel about the prudence of the LPSI interlock feature. OPPD will re-evaluate the appositeness of the LPSI interlock and other similar applications of this feature. Results of this evaluation will be provided to the NRC via separate correspondence by May 1, 1990.

Other events involving unplanned actuations of the Diesel Generators have been reported as LER's 87-008, 87-009, 88-007, 88-014, 88-024, and 88-026.

ATTACHMENT 1 TO 9004180246 PAGE 1 OF 1

Omaha Public Power District
444 South 16th Street Mall
Omaha, Nebraska 68102-2247
402/636-2000

March 28, 1990
LIC-90-0246

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

Reference: Docket No. 50-285

Gentlemen:

Subject: Licensee Event Report 90-06 for the Fort Calhoun Station

Please find attached Licensee Event Report 90-06 dated March 28, 1990. This report is being submitted pursuant to 10 CFR 50.73(a)(2)(iv).

If you should have any questions, please contact me.

Sincerely,

W. G. Gates
Division Manager
Nuclear Operations

WGG/tcm

Attachment

c: R. D. Martin, NRC Regional Administrator
A. Bournia, NRC Project Manager
P. H. Harrell, NRC Senior Resident Inspector
INPO Records Center
American Nuclear Insurers

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*** END OF DOCUMENT ***
